



SATURN V PROGRAM DIRECTIVE

NUMBER: 35

SUBJECT: IMPLEMENTATION OF SATURN V/APOLLO DESIGN CERTIFICATION REVIEW (DCR)

ORIGINAL ISSUE DATE: Aug. 25, 1966

REVISION NUMBER: 1

DATE OF REVISION: Jan. 31, 1967

PREPARED BY: SATURN V SYS ENGR MGMT OFFICE

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I. PURPOSE

The purpose of this directive is to provide Saturn V interpretation of the Design Certification Review policy imposed on MSFC through the Apollo Program Directive No. 7, dated April 21, 1966, and to assign responsibilities and establish procedures required to implement that policy.

II. SCOPE

This directive, which is applicable to all MSFC elements responsible for Saturn V design and development, sets forth the methods by which the Saturn V Program Office will establish and implement Design Certification Reviews (DCR's) for manned lunar simulation and lunar landing missions.

III. REFERENCES

- A. Apollo Program Directive No. 6A, dated August 30, 1966, Subject: Sequence and Flow of Hardware Development and Key Inspection, Review and Certification Checkpoints.
- B. Letter from MSFC Industrial Operations Director to Apollo Program Director dated October 6, 1965, which presents a recommendation to sequence the DCR as a three-phase review within the framework of present reviews and assessments.
- C. Apollo Program Directive No. 7, dated April 21, 1966, Subject: Apollo Design Certification Review.
- D. Letter from Saturn V Program Manager to Project and Staff personnel, dated October 12, 1966, Subject: Early Implementation of Saturn V DCR Dry Runs.

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IV. POLICY

- A. The Saturn V Program's Design Certification Review shall be conducted in three distinct phases that culminate in a well defined and integrated formal review at the Office of Manned Space Flight (MSF). Phases shall be as follows:

- Phase I Initial Coordinating Dry Run of the DCR to be conducted at facilities of individual prime contractors and others as required to assess and critique stage, engine and GSE contractors' inputs to the DCR.
- Phase II Final Coordinating Dry Run of the DCR to be conducted at MSFC for the MSFC Review and Assessment Board to assess the Saturn V/Apollo DCR presentation.
- Phase III Saturn V portion of Apollo Design Certification Review to be conducted at MSF by the Management Council, which acts as the Design Certification Board.

NOTE: The Apollo Design Certification Review (DCR) is conducted by oral summary presentations, supported by documented submissions which form a part of the DCR record. Cognizant NASA officials and contractor personnel, as appropriate, give the presentations.

- B. An MSFC Review and Assessment Board will be established to assist the Saturn V Program Manager in:
- Assessing proof of design and development maturity and manned safety of designated Saturn V launch vehicles.
 - Establishing MSFC position for the Apollo DCR.
- C. Implementation of the three phases of the DCR shall be governed by the following guidelines:

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IV. POLICY (Continued)

- To use system integration, stage, engine, LVGSE, and subsystem contractors to the maximum extent to give oral presentations and to provide inputs to DCR Documentation.
- To use information generated for other Saturn reviews and assessments, and in particular, to use previous Saturn DCR planning and experience:
 - To present only deltas in configuration for new models.
 - To ensure compatibility with other MSFC reviews.
- To positively assure MSFC management that the Saturn V written and oral reports will satisfy the Apollo DCR requirements in a timely, economical and effective manner.

V. RESPONSIBILITIES (See Enclosure 1 for Summary Matrix)

Encl.
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- A. The Saturn V Program Manager is responsible for the Saturn V portion of the Apollo DCR.
- (See IV. B. above for MSFC Review and Assessment Board responsibilities.)
- B. The DCR Manager, located in the Saturn V Systems Engineering Management Office, is responsible for managing the DCR for the Saturn V Program Manager with the following specific responsibilities and authorities to:
- Update Saturn V DCR Program Directive.
 - Plan, develop, implement and update DCR procedure. (See VI.)

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V. RESPONSIBILITIES (Continued)

- Coordinate DCR requirements with appropriate MSFC/Contractor elements through their designated project points of commitment.
- Furnish DCR implementation progress status to Saturn V Program Manager.
- Conduct Phase I Dry Runs at the several contractor facilities.
- Assist Saturn V Program Manager in conducting Phase II Dry Run at MSFC.
- Ensure that all inputs to DCR written reports and oral summary presentations meet the minimum requirements established within the Saturn V Program. (See VI. A.)
- Integrate inputs to Systems Engineering Summary written reports and oral summary presentations during each phase of DCR preparation into a summary assessment to support certification by the Saturn V Systems Engineering Management Chief.
- Integrate inputs to Phase II DCR written reports and oral summary presentations into a summary assessment to support certification of the launch vehicle design by the Saturn V Program Manager at the Apollo-Saturn V DCR.
- Develop written reports and oral presentations summarizing all open items upon which launch vehicle design certifications are contingent.
- Present Launch Vehicle Design Certification Summary at Phase II and Phase III DCR's.
- Track open items identified at DCR's.

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V. RESPONSIBILITIES (Continued)

C. Stage, Engine, and LVGSE Project Managers are responsible to:

- Direct implementation of DCR Procedure for their projects.
- Implement contractual coverage for their contractors' participation in the Saturn V DCR Program.
- Review and critique Phase I DCR oral and written reports.
- Ensure preparation and updating of DCR Project Documentation.
- Prepare project (Stage/LVGSE) written and oral summary reports for Phase II and Phase III DCR's.
- Present project (Stage/LVGSE) oral summaries at Phase II and Phase III DCR's.

D. Stage and LVGSE Subsystem Managers are responsible to:

- Implement DCR Procedures for their subsystems.
- Ensure preparation and updating of DCR Subsystem Documentation.

E. Reliability and Quality Office is responsible to:

- Implement DCR Procedure for the Launch Vehicle Reliability Summary.
- Review and critique Phase I Dry Runs.
- Prepare and update DCR Reliability Summary Documentation.
- Present oral summary at Phase II and Phase III DCR's.

F. Systems Engineering Office is responsible to:

- Implement DCR Procedures for the Systems Engineering Summary.
- Ensure preparation and updating of DCR Documentation.

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Phone: 877-3877**V. RESPONSIBILITIES** (Continued)

- Present Systems Engineering Summary at the Phase II and Phase III DCR's.

G. R&DO (R-TO and Labs) is responsible to:

- Review and critique subsystem, stage, engine, and LVGSE written reports and oral presentations.
- Provide technical inputs to the Systems Engineering Summary for the DCR.
- Present (as required) portions of Systems Engineering Summary during Phase II and Phase III DCR's.
- Implement requirements defined in the DCR Procedures.

VI. PROCEDURE**A. The DCR Manager** will develop detailed Saturn V procedures to provide minimum requirements for preparing DCR oral presentations and written reports as follows:

- I-V-ED Number 1, "Saturn V Procedure for Design Certification Reviews - Fragmented DCR" for the AS-501 mission.
- I-V-ED Number 2, "Saturn V Procedure for Design Certification Reviews" for all other designated Saturn V missions.

B. Phases I and II of the DCR will consist of oral summary presentations of assessments and certifications, and reviews of inputs to the DCR Documentation.**C.** Documentation to be provided to MSF two weeks prior to the DCR by the Saturn V Launch Vehicle Program Manager includes:

- A copy of all visual aids used in the DCR.
- Program Manager's summary assessment and certification of the Launch Vehicle mission sequence and trajectory.

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VI. PROCEDURE (Continued)

- Material supporting the mission sequence and trajectory presentations to be made in accordance with Section V. C. 1, Apollo Program Directive No. 7.
- DCR Report - A report containing the following shall be prepared for the Launch Vehicle:
 - Program Manager's summary assessment and certification of the Launch Vehicle.
 - A copy of Certificate of Flight Worthiness showing current endorsements.
 - Material in support of Section V. C. 2, Apollo Program Directive No. 7, including:
 - + Performance summary
 - + Equipment description
 - + Development cycle review
 - + Reliability assessment
 - + Review of factors affecting manned safety
 - + Unresolved problems and plans for corrective action
 - Certification in accordance with Section V. D, Apollo Program Directive No. 7.

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VI. PROCEDURE (Continued)

- D. The oral presentation coverage shall include the content described in Section V of Apollo Program Directive No. 7 and as shown on attached chart. (See Enclosure 2.)

Encl.
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Arthur Rudolph
Arthur Rudolph
Manager, Saturn V Program

2 Enclosures:

- Encl. 1: Summary of Saturn V DCR Responsibilities
Encl. 2: Saturn V DCR Oral Presentations

Addressees
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Addressees

MSFC

DIR, Dr. Von Braun
 DIR, Dr. Rees
 I-DIR, Gen. O'Connor
 I-DIR, Dr. Mrazek
 I-V-MGR, Dr. Rudolph
 I-V-MGR, Mr. Bramlet
 I-V-MGR, Mr. Murphy
 I-V-MGR, Mr. Bradford
 I-V-SIC, Mr. Urlaub (3)
 I-V-SIC, Mr. Paetz
 I-V-SIC, Mr. Thompson
 I-V-SII, Col. Yarchin (3)
 I-V-SII, Mr. Godfrey
 I-V-SH, Mr. Flake
 I-V-SIVB, Mr. McCulloch (3)
 I-V-SIVB, Mr. Greer
 I-V-IU, Mr. Duerr (3)
 I-V-IU, Mr. Ondrak
 I-V-G, Mr. Smith (3)
 I-V-G, Mr. Savage
 I-V-T, Mr. Burns (3)
 I-V-E, Mr. Bell (3)
 I-V-E, Mr. McCullough
 I-V-F, Mr. Rowan
 I-V-P, Mr. Sneed
 I-V-Q, Mr. Moody (3)
 I-I/IB-MGR, Col. Teir
 I-MO-DIR, Dr. Speer
 I-E-MGR, Mr. Brown (3)
 I-E-F, Mr. Stewart
 I-E-J, Mr. Drummond
 R-DIR, Mr. Weidner
 R-ASTR-DIR, Dr. Haeussermann
 R-ASTR-I, Mr. Hoberg (3)
 R-ASTR-E, Mr. Fichtner (3)

R-ASTR-EA, Mr. Shields
 R-ASTR-ES, Mr. Aden
 R-ASTR-F, Mr. Hosenthein
 R-ASTR-S, Mr. Mack (2)
 R-ASTR-N, Mr. Moore (3)
 R-ASTR-G, Mr. Mandel
 R-ASTR-B, Mr. Weber
 R-OM-DIR, Col. Fellows
 R-QUAL-DIR, Mr. Grau
 R-QUAL-J, Mr. Klauss
 R-QUAL-P, Mr. Hughes
 R-COMP-DIR, Mr. Hoelzer
 R-COMP-D, Mr. Felder
 R-AERO-DIR, Dr. Geissler
 R-AERO-P, Mr. McNair
 R-AERO-P, Mr. Teague
 R-AERO-P, Mr. Thionett
 R-AERO-F, Mr. Stone
 R-P&VE-DIR, Dr. Lucas
 R-P&VE-V, Mr. Aberg
 R-P&VE-X, Mr. Brooksbank
 R-P&VE-X, Mr. Rothe
 R-P&VE-S, Mr. Kroll
 R-P&VE-P, Mr. Paul (3)
 R-TEST-DIR, Mr. Heimburg
 R-TEST-S, Mr. Driscoll
 R-TO-DIR, Mr. Richard (3)
 R-TO-V, Mr. Smith
 R-TO-V, Mr. Davis
 MS-CH, Mr. Sorensen

KSC

I-K-MGR, Col. Montgomery

MSC

PA, Dr. Shea

SUMMARY MATRIX SATURN V DCR RESPONSIBILITIES		TYPICAL SCHEDULING (WORK DAYS BEFORE PHASE III DCR)	ACTION RESPONSIBILITIES										RE- MARKS		
ACTION ITEMS			SAT V PROG. MGR	DCR MGR/STAFF (I-V-E)	STAGE/LVGE/ ENGINE PROJ.	STAGE/LVGE/ ENGINE	CONTRACTORS	STAGE/LVGE SUBSYS. MGRS	CHIEF I-V-E	CHIEF I-V-Q	CHIEF R&D REP- REPRESENTATIVES				
ISSUE SATURN V PROGRAM DIRECTIVE NO. 35		(COMPLETE)	•	•		•				•					
ISSUE SATURN V PROCEDURE FOR DCR'S IMPLEMENT PROCEDURE		(COMPLETE) -90 THRU +25	•	•		•			•	•					
SUBMIT DCR DOCUMENTATION FOR PHASE I DCR		-61 THRU -52			•	•								•	
PRESENT ORAL SUMMARY PRESENTATIONS AT PHASE I DCR		-52 THRU -42			•									•	
REVIEW & CRITIQUE PHASE I DCR		-47 THRU -37						•	•					•	
UPDATE DCR DOCUMENTATION FOR PHASE II DCR		-25	•	•	•									•	
PRESENT ORAL SUMMARY PRESENTATIONS AT PHASE II DCR		-23 THRU -21	•	•	•									•	
REVIEW & CRITIQUE PHASE II DCR		-18	•	•										•	MSFC R+A BOARD
UPDATE DCR DOCUMENTATION FOR PHASE III DCR		-10	•	•										•	
PRESENT ORAL SUMMARY PRESENTATIONS PHASE III DCR		0 (2 DAYS)	•	•	•									•	
CLOSE OUT ACTION ITEMS FROM PHASE III DCR		+25	•	•	•									•	

P-V-E-246 -67 MCCULLOUGH - JANUARY 23 1967

ENCLOSURE 1

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